Applied Science

Introduction

The Applied Science program offers a unique educational experience for students to learn science by doing science. The program emphasizes flexibility through a broad scientific base along with experience through a chosen career emphasis. In a world of new products and processes, the program also fosters the creativity needed to contribute to new scientific advances. Our program prepares graduates for a variety of expanding careers in biotechnology, nanotechnology, health sciences, materials science and science education. The strong academic content of the Applied Science program will also prepare graduates for entry into a variety of professional (*such as chiropractic, dental, medical, optometry, pharmacy, physical therapy or veterinary*) and graduate schools.

The curriculum is based on a core of chemistry, physics, biology and mathematics. Students will explore cutting edge topics in nanotechnology and biotechnology in addition to the many facets of applied science, including technical writing, data analysis, interpersonal communication and experiment design. Principles in management, marketing, manufacturing, and finance are introduced.

In addition to working with instructors from a broad range of fields, students gain significant hands-on experience through a field or cooperative education experience. This versatility offers the qualities that employers are looking for in today's college graduates — interpersonal and problem-solving skills, high energy level and good judgment.

Our graduates are able to enter a myriad of occupations and career paths after graduation. Some of our graduates have chosen to enter the work force directly by becoming scientific sales representatives or laboratory technicians. Many of our graduates have continued with their passion in science and have chosen graduates schools in fields ranging from marine microbiology to bio-nano chemistry, while other graduates have entered dental or pharmacy schools.

In addition to fulfilling the university's basic admission requirements, Applied Science applicants must also have an ACT math score of at least 22 (*SAT math 510*) and either rank in the upper 40 percent of your high school class (*or GPA of 3.0*), or have a composite ACT score of 22. Nontraditional or transfer student admission will be based on current admission standards with guidance from the program director.

Program Requirements for the Interdisciplinary Science Concentration

Total for Graduation	120 credits
General Education	42-43 credits
Major Studies	77-78 credits

General Education

42-43 credits required

A. Communication Skills — 8 credits

ENGL-101	Freshman English – Composition *or*	
ENGL-111	Freshman English – Honors I	3
ENGL-102	Freshman English – Reading and Related Writing *or*	
ENGL-112	Freshman English – Honors II	3
SPCOM-100	Fundamentals of Speech	2

B. Analytic Reasoning — 7-8 credits

MATH-153	Calculus I *or*	
MATH-156	Calculus and Analytic Geometry I	4-5
STAT-320	Statistical Methods *or*	
STAT-330	Probability and Statistics for Engineering and the Sciences	3

C. Health and Physical Education — 2 credits

Courses must be from areas of health, physical education or nutrition.

D. Humanities and the Arts — 9 credits

PHIL-235	General Ethics	3

Remaining courses must be from two or more areas including creative arts, history, literature, music appreciation, and performing arts.

E. Social and Behavioral Sciences — 9 credits

Courses must be from three or more areas including anthropology, economics, geography, political science, psychology and sociology.

F. Natural Sciences (with Lab) — 5 credits

CHEM-135	College Chemistry I	5

G. Technology — 2 credits

Major Studies

77-78 credits required

Required Courses — 43 credits

APSC-101	Applied Science Profession I	1
APSC-311	Issues for Science Professionals	3
APSC-349	Cooperative Education Program in Applied Science *or*	
APSC-398	Field Experience in Applied Science	1-8
APSC-401	Applied Science Profession II	1
BIO-135	Organismal Biology	4
BIO-136	College Molecular Cell Biology I	5
CHEM-136	College Chemistry II	5
CHEM-201	Organic Chemistry I	4
CHEM-331	Quantitative Analysis	3
CHEM-335	Instrumental Methods of Analysis	3
ENGL-415	Technical Writing	3
PHYS-241	College Physics I *or*	
PHYS-281	University Physics I	5
PHYS-242	College Physics II *or*	
PHYS-282	University Physics II	5

Selectives — 14 credits

Choose any 200 level or higher science-related courses approved by your program director to fulfill the 120 credit graduation requirement.

Minor or Second Major — 18-35 credits

Choose a minor that is not Chemistry, Biology, or Physics. Students should work with a minor adviser to complete requirements. In lieu of a minor, students may apply credits from a completed second major. Students must work with both program directors to meet requirements for each major and recognize that completion of two majors will exceed 120 credits.

Program Requirements for the Biotechnology Concentration

Total for Graduation .....120 credits
General Education ..... 42-43 credits
Major Studies .....77-78 credits

General Education

42-43 credits required

A. Communication Skills **8 credits**

ENGL-101 Freshman English – Composition *or*
ENGL-111 Freshman English – Honors I 3
ENGL-102 Freshman English – Reading and Related Writing *or*
ENGL-112 Freshman English – Honors II 3
SPCOM-100 Fundamentals of Speech.....2

B. Analytic Reasoning **7-8 credits**

MATH-153 Calculus I *or*
MATH-156 Calculus and Analytic Geometry I 4-5
STAT-320 Statistical Methods *or*
STAT-330 Probability and Statistics for Engineering and the Sciences.....3

C. Health and Physical Education **2 credits**

Courses must be from areas of health, physical education or nutrition.

D. Humanities and the Arts **9 credits**

PHIL-235 General Ethics 3

Remaining courses must be from two or more areas including creative arts, history, literature, music appreciation, and performing arts.

E. Social and Behavioral Sciences **9 credits**

Courses must be from three or more areas including anthropology, economics, geography, political science, psychology and sociology.

F. Natural Sciences (with Lab) **5 credits**

CHEM-135 College Chemistry I 5

G. Technology **2 credits**

Major Studies

77-78 credits required

Required Courses **65-69 credits**

APSC-101 Applied Science Profession I 1
APSC-311 Issues for Science Professionals 3
APSC-349 Cooperative Education Program in Applied Science *or*
APSC-398 Field Experience in Applied Science 1-8
APSC-401 Applied Science Profession II 1
BIO-135 Organismal Biology 4
BIO-136 College Molecular Cell Biology I 5
BIO-235 Molecular Cell Biology II 4
BIO-370 Biotechnology 3
BIO-400 Special Topics in Biotechnology 1-2
BIO-470 Advanced Biotechnology 5
BIO-489 Advanced Biology Experience 1-4
CHEM-136 College Chemistry II 5
CHEM-201 Organic Chemistry I 4
CHEM-204 Organic Chemistry II Lecture 3
CHEM-206 Organic Chemistry II Laboratory 1
CHEM-311 Biochemistry 4
CHEM-331 Quantitative Analysis 3
CHEM-412 Advanced Biochemistry 3
ENGL-415 Technical Writing 3
PHYS-241 College Physics I *or*
PHYS-281 University Physics I 5
PHYS-242 College Physics II *or*
PHYS-282 University Physics II 5

Selective Courses ***8-13 credits***

Choose selectives that are 200 level or higher biotechnology-related courses approved by your adviser to fulfill the 120 credit graduation requirement.

Program Requirements for the Environmental Science Concentration

Total for Graduation .....120 credits
General Education ..... 42-43 credits
Major Studies .....77-78 credits

General Education

42-43 credits required

A. Communication Skills — 8 credits

ENGL-101 Freshman English – Composition *or*
ENGL-111 Freshman English – Honors I 3
ENGL-102 Freshman English – Reading and Related Writing *or*
ENGL-112 Freshman English – Honors II 3
SPCOM-100 Fundamentals of Speech 2

B. Analytic Reasoning — 7-8 credits

MATH-153 Calculus I *or*
MATH-156 Calculus and Analytic Geometry I 4-5
STAT-320 Statistical Methods *or*
STAT-330 Probability and Statistics for Engineering and the Sciences.....3

C. Health and Physical Education — 2 credits

Courses must be from areas of health, physical education or nutrition.

D. Humanities and the Arts — 9 credits

PHIL-235 General Ethics 3

Remaining courses must be from two or more areas including creative arts, history, literature, music appreciation, and performing arts.

E. Social and Behavioral Sciences — 9 credits

GEOG-251 Introduction to Geography and Geographic Information Systems.....4

Remaining courses must be from two or more areas including anthropology, economics, geography, political science, psychology and sociology.

F. Natural Sciences (with Lab) — 5 credits

CHEM-135 College Chemistry I 5

G. Technology — 2 credits

Major Studies

77-78 credits required

Environmental Science Course Requirements — 54 credits

APSC-101 Applied Science Profession I 1
APSC-311 Issues for Science Professionals 3
APSC-349 Cooperative Education Program in Applied Science or
APSC-398 Field Experience in Applied Science 1-8
APSC-401 Applied Science Profession II 1
BIO-111 Science, Society and the Environment or.....
BIO-141 Plants and People 4
BIO-135 Organismal Biology 4
BIO-136 College Molecular Cell Biology I 5
BIO-350 Ecology 3
BIO-351 Ecology Lab 2
BIO-444 Problem Solving in Environment Studies 3
CHEM-136 College Chemistry II 5
CHEM-201 Organic Chemistry I 4
ENGL-415 Technical Writing 3
GEOG-351 Intermediate Geographic Information Systems 4
PHYS-258 Introductory Geology 2
PHYS-241 College Physics I or
PHYS-281 University Physics I 5
PHYS-XXX Soil Conservation 4

Environmental Science Technical Emphasis — 13-15 credits

Choose one of the following emphasis areas:

Water Resources (13 credits)

BIO-306 General Microbiology 4
CHEM-331 Quantitative Analysis 3
CHEM-335 Instrumental Methods of Analysis 3
CHEM-353 Environmental Chemistry 3

Plant Sciences (14 credits)

BIO-242 Botany 4
BIO-322 Plant Pathology 3
BIO-343 Plant Physiology 4
CHEM-331 Quantitative Analysis 3

Land Resources (15 credits)

BIO-242 Botany 4
BIO-324 Plant Taxonomy 3
BIO-352 Plant Ecology 4
GEOG-451 Advanced Geographic Information Systems 4

Selective Courses — xx-xx credits

Choose selective courses that are 200 level or higher in biology, chemistry or physics and approved by your adviser to fulfill the 120 credit graduation requirement.

Program Requirements for the Materials Science Concentration

Total for Graduation ..... 121-125 credits
General Education ..... 43-45 credits
Major Studies ..... 78-80 credits

General Education

43-45 credits required

A. Communication Skills **8 credits**

ENGL-101 Freshman English – Composition *or*
ENGL-111 Freshman English – Honors I 3
ENGL-102 Freshman English – Reading and Related Writing *or*
ENGL-112 Freshman English – Honors II 3
SPCOM-100 Fundamentals of Speech 2

B. Analytic Reasoning **8-10 credits**

MATH-153 Calculus I *or*
MATH-156 Calculus and Analytic Geometry I 4-5
MATH-154 Calculus II *or*
MATH-157 Calculus and Analytic Geometry II. 4-5

C. Health and Physical Education **2 credits**

Courses must be from areas of health, physical education or nutrition.

D. Humanities and the Arts **9 credits**

PHIL-235 General Ethics 3

Remaining courses must be from two or more areas including creative arts, history, literature, music appreciation, and performing arts.

E. Social and Behavioral Sciences **9 credits**

Courses must be from three or more areas including anthropology, economics, geography, political science, psychology and sociology.

F. Natural Sciences (with Lab) **5 credits**

CHEM-135 College Chemistry I 5

G. Technology **2 credits**

Major Studies

78-80 credits required

Required Courses **68 credits**

APSC-101 Applied Science Profession I 1
APSC-311 Issues for Science Professionals. 3
APSC-349 Cooperative Education Program in Applied Science *or*
APSC-398 Field Experience in Applied Science. 1-8
APSC-401 Applied Science Profession II 1
CHEM-136 College Chemistry II 5
CHEM-201 Organic Chemistry I. 4
CHEM-301 Physical Chemistry Lecture. 3
CHEM-303 Physical Chemistry Laboratory. 1
CHEM-325 Chemistry of Polymers. 4
CHEM-341 Chemistry of Materials. 4
CHEM-440 Advanced Materials Laboratory. 3
CHEM-470 Chemistry of Materials II. 3
ELEC-290 Circuits and Devices. 4
ENGL-415 Technical Writing 3
MATH-250 Differential Equations with Linear Algebra *or*
MATH-255 Differential Equations 3
MFGT-110 Materials and Manufacturing Processes *or*
MFGT-150 Introduction to Engineering Materials. 3
MFGT-251 Polymer and Composite Processes *or*
MFGT-253 Joining and Casting Processes. 3
PHYS-281 University Physics I. 5
PHYS-282 University Physics II. 5
PHYS-325 Strength of Materials. 3
PHYS-327 Solid State Physics. 3
STAT-330 Probability and Statistics for Engineering and the Sciences. 3

Selective Courses **10-12 credits**

Choose 3 of the following 4 selective courses:

BIO-136 College Molecular Cell Biology I 5
BIO-235 Molecular Cell Biology II. 4
CHEM-331 Quantitative Analysis. 3
CHEM-335 Instrumental Methods of Analysis 3

Program Requirements for the Nanoscience Concentration

Total for Graduation .....120-122 credits
General Education ..... 43-45 credits
Major Studies ..... 77 credits

Program Requirements

General Education

43-45 credits required

A. Communication Skills **8 credits**

ENGL-101 Freshman English – Composition *or*
ENGL-111 Freshman English – Honors 3
ENGL-102 Freshman English – Reading and Related Writing *or*
ENGL-112 Freshman English – Honors II 3
SPCOM-100 Fundamentals of Speech 2

B. Analytic Reasoning **8-10 credits**

MATH-153 Calculus I *or*
MATH-156 Calculus and Analytic Geometry I 4-5
MATH-154 Calculus II *or*
MATH-157 Calculus and Analytic Geometry II. 4-5

C. Health and Physical Education **2 credits**

Courses must be from areas of health, physical education or nutrition.

D. Humanities and the Arts **9 credits**

PHIL-235 General Ethics 3

Remaining courses must be from two or more areas including creative arts, history, literature, music appreciation, and performing arts.

E. Social and Behavioral Sciences **9 credits**

Courses must be from three or more areas including anthropology, economics, geography, political science, psychology and sociology.

F. Natural Sciences (with Lab) **5 credits**

CHEM-135 College Chemistry I 5

G. Technology **2 credits**

Major Studies

77 credits required

Required Courses **65 credits**

APSC-101 Applied Science Profession I 1
APSC-311 Issues for Science Professionals. 3
APSC-349 Cooperative Education Program in Applied Science *or*
APSC-398 Field Experience in Applied Science. 1-8
APSC-401 Applied Science Profession II 1
BIO-136 College Molecular Cell Biology I 5
BIO-235 Molecular Cell Biology II.....4
CHEM-136 College Chemistry II 5
CHEM-201 Organic Chemistry I.....4
CHEM-301 Physical Chemistry Lecture. 3
CHEM-303 Physical Chemistry Laboratory. 1
CHEM-331 Quantitative Analysis 3
CHEM-335 Instrumental Methods of Analysis. 3
CHEM-341 Chemistry of Materials.....4
ENGL-415 Technical Writing 3
NANO-101 Exploration of Nanotechnology 2
NANO-301 Nanostructures. 3
NANO-330 Characterization Methods of Nanomaterials. 3
NANO-401 Nanotechnology Applications 3
PHYS-281 University Physics I.....5
PHYS-282 University Physics II.....5
STAT-330 Probability and Statistics for Engineering and the Sciences 3

Selective Courses **12 credits**

Choose 12 credits from the following list of selective courses:

CHEM-204 Organic Chemistry II Lecture. 3
CHEM-206 Organic Chemistry II Laboratory.....1
CHEM-311 Biochemistry.....4
CHEM-325 Chemistry of Polymers. 4
CHEM-440 Advanced Materials Laboratory..... 1-3
CHEM-470 Chemistry of Materials II.....3
MFGT-251 Polymer and Composite Processes.....3
MFGT-253 Joining and Casting Processes.....3